

DATA SHEET

MODULETEK: QSFP-40G-SR4-C-G11

40G QSFP SR4 Short Wavelength (850nm) Transceiver

Overview

QSFP-40G-SR4-C-G11 optical transceivers are based on 40G Ethernet IEEE 802.3 standard and complies with SFF-8636 standard, providing fast and reliable interface for 40G Ethernet. It provides four independent transmit and receive channels, each capable of 10Gbps, with a total bandwidth of 40Gbps, making it a high-performance, low-power, short-haul interconnect solution.

Product Features

- Supports 4-channel 10.3125Gbps bi-directional data links
- Compliant with IEEE 802.3
- Compliant with SFF-8636
- Hot-pluggable QSFP footprint
- 850nm VCSEL array laser transmitter
- Single 1X12 MPO receptacle
- Built-in digital diagnostic functions
- Up to 82m on OM2 Multimode Fiber
- Up to 300m on OM3 Multimode Fiber
- Up to 400m on OM4/OM5 Multimode Fiber
- Low power consumption (Operating Power <1.5W)
- Single power supply 3.3V
- RoHS-6 Compliant
- Operating temperature range (Case Temperature): Commercial Level: 0°C to 70°C



Applications

- 40GBASE-SR4 40G Ethernet

Ordering Information

| Part Number | Produce ID | Description | Color on Clasp |
|---|------------|--|----------------|
| QSFP-40G-SR4-C-G11 | M548913 | 40G QSFP 850nm MPO receptacle, up to 300m(OM3) or 400m(OM4) on MMF | beige |
| Notes: 1. Product ID is the abbreviated order number of our company's product standard model | | | |
| For More Information Or To Order The Above Products, Please Contact: Email: sales@moduletek.com ModuleTek Web: www.moduletek.com | | | |

General Specifications

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|-----------------------|------------------|------|-----|------|------|---------|
| Operating Temperature | T _C | 0 | | 70 | °C | 1 |
| Storage Temperature | T _{STO} | -40 | | 85 | °C | 2 |
| Supply Current | I _{CC} | | | 450 | mA | 3 |
| Input Voltage | V _{CC} | 3.15 | 3.3 | 3.46 | V | |
| Maximum Voltage | V _{MAX} | -0.5 | | 3.6 | V | |
| Power Dissipation | P | | | 1500 | mW | |

Notes:

1. Case temperature
2. Ambient temperature
3. For electrical power interface

Link Distances

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|--|--------|-----|---------|---------------------|------|---------|
| Data Rate (Per Channel) | DR | | 10.3125 | | Gbps | |
| Bit Error Rate | BER | | | 1x10 ⁻¹² | | 1 |
| OM2 Multimode Fiber (Bandwidth 500MHz*km) | L | | | 82 | M | |
| OM3 Multimode Fiber (Bandwidth 2000MHz*km) | L | | | 300 | M | |
| OM4/OM5 Multimode Fiber (Bandwidth 4700MHz*km) | L | | | 400 | M | |

Notes:

1. Measured with data rate at 10.3125Gbps, PRBS 2³¹-1

Optical Characteristics – Transmitter

$V_{CC}=3.15V$ to $3.46V$, $T_C=0^{\circ}C$ to $70^{\circ}C$

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|---|-----------------|------|-----|------|------|---------|
| Tx Optical Power (Per Channel) | P_{TX} | -7.6 | | 2.4 | dBm | 1 |
| Optical Center Wavelength | λ_C | 840 | | 860 | nm | |
| Extinction Ratio | ER | 3 | | | dB | |
| Spectral Width (RMS) | $\Delta\lambda$ | | | 0.65 | nm | |
| Average Launch Power of OFF Transmitter (Per Channel) | P_{OUT_OFF} | | | -30 | dBm | 1 |

Notes:

1.Average optical power

Optical Characteristics – Receiver

$V_{CC}=3.15V$ to $3.46V$, $T_C=0^{\circ}C$ to $70^{\circ}C$

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|-----------------------------------|-------------|------|-----|-----|------|---------|
| Optical Center Wavelength | λ_C | 840 | | 860 | nm | |
| Receive Sensitivity (Per Channel) | P_{RX} | -9.5 | | 2.4 | dBm | 1 |
| LOS Assert | LOS_A | -30 | | | dBm | |
| LOS De-Assert | LOS_D | | | -12 | dBm | |
| LOS Hysteresis | LOS_H | 0.5 | | | dB | |

Notes:

1.Average optical power, using 10.3125 Gbps, PRBS 2^{31} -1 signal test, BER 1×10^{-12}

Electrical Characteristics – Transmitter

$V_{CC}=3.15V$ to $3.46V$, $T_C=0^{\circ}C$ to $70^{\circ}C$

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|-------------------------------|--------------|----------|-----|--------------|----------|---------|
| Input differential impedance | R_{IN} | | 100 | | Ω | |
| Differential Data Input Swing | V_{IN_PP} | 180 | | 1200 | mV | |
| Transmitter Disable Voltage | V_D | 2 | | V_{CC} | V | |
| Transmitter Enable Voltage | V_{EN} | V_{EE} | | $V_{EE}+0.8$ | V | |

Electrical Characteristics – Receiver

$V_{CC}=3.15V$ to $3.46V$, $T_C=0^{\circ}C$ to $70^{\circ}C$

| Parameter | Symbol | Min | Typ | Max | Unit | Remarks |
|--------------------------------------|---------------|----------|-----|----------------|------|---------|
| Differential output swing | V_{OUT_PP} | 300 | | 850 | mV | |
| Data Output Rise/Fall Time (20%-80%) | t_r/t_f | 28 | | | ps | |
| LOS Assert | V_{LOS_A} | 2 | | V_{CC_HOST} | V | |
| LOS De-Assert | V_{LOS_D} | V_{EE} | | $V_{EE}+0.8$ | V | |

Digital Diagnostic Function

QSFP-40G-SR4-C-G11 supports the 2-wire serial communication protocol defined in SFF-8636, which provides access to digital diagnostic information through a 2-wire interface. The internal micro-controller unit provides real-time access to module operating parameters such as module temperature, laser bias current, transmit optical power, receive optical power and module supply voltage. The module implements the SFF-8636's alarm function, which alerts the user when specific operating parameters are out of normal range.

| Digital Diagnostic Threshold Range | | | | |
|------------------------------------|-----------------|-------------------|------------------|----------------|
| Parameter | High Alarm(HEX) | High Warning(HEX) | Low Warning(HEX) | Low Alarm(HEX) |
| Temperature($^{\circ}C$) | 75.00(4B00h) | 70.00(4600h) | 0.00(0000h) | -5.00(FB00h) |
| Voltage(V) | 3.63(8DCCh) | 3.46(8728h) | 3.13(7A44h) | 2.97(7404h) |
| Bias Current(mA) | 12.00(1770h) | 11.50(1676h) | 2.00(03E8h) | 1.00(01F4h) |
| Tx Power(dBm) | 3.40(5575h) | 2.40(43E2h) | -7.60(06CAh) | -8.60(0565h) |
| Rx Power(dBm) | 3.40(5575h) | 2.40(43E2h) | -9.50(0462h) | -10.50(037Ch) |

A0h Write Protection

| Security Level 1 Password (Factory Value) | | |
|---|------|-------------|
| Password Entry ADDR | Size | Vaules(HEX) |
| A0h, 123h-126h | 4 | 00 00 10 11 |

QSFP-40G-SR4-C-G11 has the function of A0h write-protection, which allows users to enter the security level 1 working state and write the contents of Table 00 and Table 02 of the device address A0h. The method to enter the security level 1 working state is to write the security level 1 password sequentially in the 123h-126h registers of the device address A0h; after entering the security level 1, the user can modify the contents of the 127h Table Selection Register of the device address A0h to write

the contents of Table 00 and Table 02. This version module supports users to modify the password of security level 1 by writing a new security level 1 password in the 119h-122h register(Password Change Entry) in the device address A0h; the new security level 1 password ranges from 00000000-7FFFFFFF (hex), and the highest bit of the new security level 1 password must be 0b.

A0h Register Map Low 128 Bytes

| Lower Memory Map (A0h) | | | | |
|------------------------|------|---|---|---------------------|
| IIC ADDR | Size | Name | Description | Initial Vaules(HEX) |
| 0 | 1 | Identifier | QSFP+ | 0D |
| 1 | 1 | Revision Compliance | SFF-8636 Rev 2.10 | 08 |
| 2 | 1 | Status | Bit7-Bit3=00000: Reserved Bit2=0: Upper memory Paged (at least upper page 03h implemented) Bit1: Digital state of the IntL Interrupt output pin Bit0: Data Not Ready | Variable |
| 3 | 1 | Channel Status LOS Flag | Tx/Rx LOS Flag | Variable |
| 4 | 1 | Channel Status TX Adapt EQ Fault/TxFault Flag | Bit7-Bit4: This product does not support this function Bit3-Bit0: TxFault Flag | Variable |
| 5 | 1 | Channel Status LOL Flag | This product does not support this function, Initize to 00 (hex) | 00 |
| 6 | 1 | Module Monitor Temperature Alarm/Warning Flag | Bit7-Bit4: Temperature Alarm/Warning Flag Bit3-Bit2: Reserved Bit1: This product does not support this function Bit0: Initialization completion flag bit | Variable |
| 7 | 1 | Module Monitor Vcc Alarm/Warning Flag | Vcc Alarm/Warning Flag | Variable |
| 8 | 1 | Vendor Specific | Vendor Specific information | 00 |
| 9-10 | 2 | Channel Mon RxPower Alarm/Warning Flag | RxPower Alarm/Warning Flag | Variable |
| 11-12 | 2 | Channel Mon TxBias Alarm/Warning Flag | TxBias Alarm/Warning Flag | Variable |

| | | | | |
|-------|----|--|--|--|
| 13-14 | 2 | Channel Mon TxPower Alarm/Warning Flag | TxPower Alarm/Warning Flag | Variable |
| 15-18 | 4 | Reserved | Reserved channel monitor flags | 00 00 00 00 |
| 19-21 | 3 | Vendor Specific | Vendor Specific information | 00 00 00 |
| 22-23 | 2 | Module Monitor Temperature | Temperature diagnosis, unit is 1/256°C | Variable |
| 24-25 | 2 | Reserved | Reserved | 00 00 |
| 26-27 | 2 | Module Monitor Voltage | Supply Voltage diagnosis, unit is 100uV | Variable |
| 28-29 | 2 | Reserved | Reserved | 00 00 |
| 30-33 | 4 | Vendor Specific | Vendor Specific information | 00 00 00 00 |
| 34-35 | 2 | Channel Mon Rx1 Power | Rx1 average receive power diagnosis, unit of 0.1uW | Variable |
| 36-37 | 2 | Channel Mon Rx2 Power | Rx2 average receive power diagnosis, unit of 0.1uW | Variable |
| 38-39 | 2 | Channel Mon Rx3 Power | Rx3 average receive power diagnosis, unit of 0.1uW | Variable |
| 40-41 | 2 | Channel Mon Rx4 Power | Rx4 average receive power diagnosis, unit of 0.1uW | Variable |
| 42-43 | 2 | Channel Mon Tx1 Bias | Tx1 bias current diagnosis, unit of 2uA | Variable |
| 44-45 | 2 | Channel Mon Tx2 Bias | Tx2 bias current diagnosis, unit of 2uA | Variable |
| 46-47 | 2 | Channel Mon Tx3 Bias | Tx3 bias current diagnosis, unit of 2uA | Variable |
| 48-49 | 2 | Channel Mon Tx4 Bias | Tx4 bias current diagnosis, unit of 2uA | Variable |
| 50-51 | 2 | Channel Mon Tx1 Power | Tx1 average optical power diagnosis, unit of 0.1uW | Variable |
| 52-53 | 2 | Channel Mon Tx2 Power | Tx2 average optical power diagnosis, unit of 0.1uW | Variable |
| 54-55 | 2 | Channel Mon Tx3 Power | Tx3 average optical power diagnosis, unit of 0.1uW | Variable |
| 56-57 | 2 | Channel Mon Tx4 Power | Tx4 average optical power diagnosis, unit of 0.1uW | Variable |
| 58-73 | 16 | Reserved | Reserved | 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 |
| 74-81 | 8 | Vendor Specific | Vendor Specific information | 00 00 00 00 00 00 00 00 |

| | | | | |
|---------|---|---------------------------------|--|-------------|
| 82-85 | 4 | Reserved | Reserved | 00 00 00 00 |
| 86 | 1 | Control TxDisable | Bit7-Bit4=0000: Reserved Bit3: Bit of Channel4 Laser disable Bit2: Bit of Channel3 Laser disable Bit1: Bit of Channel2 Laser disable Bit0: Bit of Channel1 Laser disable | Variable |
| 87 | 1 | Control Rx Rate Select | This product does not support this function, Initize to 00 (hex) | 00 |
| 88 | 1 | Control Tx Rate Select | This product does not support this function, Initize to 00 (hex) | 00 |
| 89-92 | 4 | Reserved | Reserved | 00 00 00 00 |
| 93 | 1 | Control Power | This product does not support this function, Initize to 00 (hex) | 00 |
| 94-97 | 4 | Reserved | Reserved | 00 00 00 00 |
| 98 | 1 | Control Tx/Rx CDR | his product does not support this function, Initize to 00 (hex) | 00 |
| 99 | 1 | Control LP/TxDis, IntL/LOSL | Bit7-Bit2=000000 Reserved Bit1 LPMoDe/TxDis input signal control Bit0 IntL/LOSL output signal control | Variable |
| 100 | 1 | Mask Tx/Rx LOS | Masking Tx/Rx LOS | Variable |
| 101 | 1 | Mask Tx Adapt EQ Fault/TxFault | Bit7-Bit4: This product does not support this function Bit3-Bit0: Masking TxFault | Variable |
| 102 | 1 | Mask Tx/Rx CDR LOL | This product does not support this function, Initize to 00 (hex) | 00 |
| 103 | 1 | Mask Temperature Alarm/Warning | Masking Temperature Alarm/Warning | Variable |
| 104 | 1 | Mask Vcc Alarm/Warning | Masking Voltage Alarm/Warning | Variable |
| 105-106 | 2 | Vendor Specific | User-defined | FF FF |
| 107 | 1 | Max Power Consumption | Maximum power consumption of module 1.5W, unit of 0.1W | 0F |
| 108-109 | 2 | Propagation Delay | This product does not support this function, Initize to 00 (hex) | 00 |
| 110 | 1 | Free Side Device Properties | Bit7-Bit4=0000 Power 1.5W or higher Bit3=0 This product does not support this function Bit2-Bit0=000 3.3 V | 00 |
| 111-112 | 2 | Assigned for use by PCI Express | This product does not support this function, Initize to 00 (hex) | 00 00 |
| 113 | 1 | Free Side Device Properties | This product does not support this function, Initize to 00 (hex) | 00 |

| | | | | |
|---------|---|--------------------------------------|--|-------------|
| 114 | 1 | Use by microQSFP | This product does not support this function, Initize to 00 (hex) | 00 |
| 115 | 1 | ModSelL wait time | This product does not support this function, Initize to 00 (hex) | 00 |
| 116 | 1 | Secondary Extended Spec Compliance | 40GBASE-SR4 | 00 |
| 117-118 | 2 | Reserved | Reserved | 00 00 |
| 119-122 | 4 | Password Change Entry Area(optional) | Modify security level 1 password entry, power-up default 00000000(hex); readback not supported after writing | 00 00 00 00 |
| 123-126 | 4 | Password Entry Area (optional) | Security level 1 password entry, power-up default 00000000(hex); readback not supported after writing | 00 00 00 00 |
| 127 | 1 | Page Select Byte | Table selection, select A0h high 128 byte page | 00 |

A0h Register Map High 128 Bytes

| Upper Memory Map Page 00h | | | | |
|---------------------------|------|---------------------------------|--|----------------------------|
| ICC Addr | Size | Name | Description | Initial Value(HEX) |
| 128 | 1 | Identifier | QSFP+ | 0D |
| 129 | 1 | Ext. Identifier | Bit7Bit6=00: Power Class 1 Module (<1.5W) Bit5=0: Power Class 8 not implemented Bit4=0: No CLEI code Bit3=0: Tx without CDR function Bit2=0: Rx without CDR function Bit1-Bit0=00: Power Classes 1 to 4 | 00 |
| 130 | 1 | Connector Type | MPO connector | 0C |
| 131-138 | 8 | Specification Compliance | 40GBASE-SR4 Ethernet | 04 00 00 00 00 00 00 00 |
| 139 | 1 | Encoding | NRZ | 03 |
| 140 | 1 | Nominal bit rate | Unit is 100Mbps | 68 |
| 141 | 1 | Extended Rate Select Compliance | No rate selection function | 00 |
| 142 | 1 | Length (SMF) | SMF transmission distance, unit of 1km | 00 |
| 143 | 1 | Length (OM3 50 um) | OM3 transmission distance 300M, unit of 2M | 96 |
| 144 | 1 | Length (OM2 50 um) | OM2 transmission distance 82M, unit of 1M | 52 |

| | | | | |
|---------|----|----------------------|---|-------------------|
| 145 | 1 | Length (OM1 62.5 um) | OM1 transmission distance, unit of 1M | 00 |
| 146 | 1 | Length (OM4 50 um) | OM4 transmission distance 400M, unit of 2M | C8 |
| 147 | 1 | Device technology | Bit7-Bit4=0000: 850nm VCSEL Bit3=0: No wavelength control Bit2=0: Uncooled transmitter device Bit1=0: Pin detector Bit0=0: Transmitter not tunable | 00 |
| 148-163 | 16 | Vendor name | MODULETEK | ASCII Format |
| 164 | 1 | Extended Module | InfinBand application are not supported | 00 |
| 165-167 | 3 | Vendor OUI | IEEE Company Identifier for the vendor | 00 00 00 |
| 168-183 | 16 | Vendor PN | QSFP-40G-SR4 | ASCII Format |
| 184-185 | 2 | Vendor rev | Vendor Part Revision Number | Defined by vendor |
| 186-187 | 2 | Wavelength | Wavelength is 850nm , unit of 0.05nm | 42 68 |
| 188-189 | 2 | Wavelength tolerance | Wavelength tolerance is 40nm , unit of 0.005nm | 1F 40 |
| 190 | 1 | Max case temp | Max case temp is 70°C , unit of °C | 46 |
| 191 | 1 | CC_BASE | The check code of Bytes 128-190 | Defined by vendor |
| 192 | 1 | Options | 40GBASE-SR4 | 00 |
| 193 | 1 | Options | Bit7=0 Reserved Bit6=1 LPMode/TxDis input signal is configurable using byte 99, bit 1 Bit5=1 IntL/RxLOSL output signal is configurable using byte 99, bit 0 Bit4-Bit3=00 This product does not support this function Bit2=1 Tx input equalizers fixed-programmable implemented Bit1=1 Rx output emphasis fixed-programmable implemented Bit0=1 Rx output amplitude fixed-programmable implemented | 67 |
| 194 | 1 | Options | Bit7-Bit4=0000: This product does not support this function Bit3=1: Rx Squelch Disable implemented Bit2=1: Rx Output Disable capable implemented Bit1=1: Tx Squelch Disable implemented Bit0=1: Tx Squelch implemented | 0F |

| 195 | 1 | Options | Bit7=1: Memory Page 02 implemented Bit6=0: Memory Page 01 not implemented Bit5=0: Rate selection function not implemented Bit4=1: Tx-DISABLE implemented Bit3=1: Tx-FAULT signal implemented Bit2=0: Tx Squelch implemented to reducing by OMA Bit1=1: Tx Los of signal implemented Bit0=0: Pages 20-21h not implemented | 9A |
|----------------------------------|------|----------------------------|---|--------------------|
| 196-211 | 16 | Vendor SN | Vendor Part Serial Number | Defined by vendor |
| 212-219 | 8 | Date Code | Date | Defined by vendor |
| 220 | 1 | Diagnostic Monitoring Type | Bit7-Bit6=00: Reserved Bit5=1: Temperature monitoring implemented Bit4=1: Supply voltage monitoring implemented Bit3=1: Received power measurements type is average power Bit2=1: Transmitter power measurement supported Bit1-Bit0=00: Reserved | 3C |
| 221 | 1 | Enhanced Options | Bit7-Bit5=000: Reserved Bit4=1: The initialization complete flag at Byte 6 bit 0 is implemented Bit3=0: Does not support rate selection Bit2=0: This bit is reserved and reads 0 Bit1=0: This product does not support this function Bit0=1: Software reset is implemented. Use byte 93, bit 7 | 11 |
| 222 | 1 | BR, nominal | Nominal baud rate, units of 250Mbps | 2A |
| 223 | 1 | CC_EXT | The check code of Byte 192-222 | Defined by vendor |
| 224-255 | 32 | Vendor Specific | Vendor Specific information | Defined by vendor |
| Upper Memory Map Page 02h | | | | |
| IIC Addr | Size | Name | Description | Initial Value(HEX) |
| 128-255 | 128 | User-writable EEPROM | User defined, readable and writeable under security level 1 | User-defined |
| Upper Memory Map Page 03h | | | | |
| IIC Addr | Size | Name | Description | Initial Vlan(HEX) |

| | | | | |
|---------|----|---------------------|-----------------------------|-------------------------------|
| 128-129 | 2 | Temp High Alarm | Temperature high alarm | See Table Of Threshold Ranges |
| 130-131 | 2 | Temp Low Alarm | Temperature low alarm | See Table Of Threshold Ranges |
| 132-133 | 2 | Temp High Warning | Temperature high warning | See Table Of Threshold Ranges |
| 134-135 | 2 | Temp Low Warning | Temperature low warning | See Table Of Threshold Ranges |
| 136-143 | 8 | Reserved | Reserved | 00 00 00 00 00 00 00 00 |
| 144-145 | 2 | Vcc High Alarm | Voltage high alarm | See Table Of Threshold Ranges |
| 146-147 | 2 | Vcc Low Alarm | Voltage low alarm | See Table Of Threshold Ranges |
| 148-149 | 2 | Vcc High Warning | Voltage high warning | See Table Of Threshold Ranges |
| 150-151 | 2 | Vcc Low Warning | Voltage low warning | See Table Of Threshold Ranges |
| 152-159 | 8 | Reserved | Reserved | 00 00 00 00 00 00 00 00 |
| 160-175 | 16 | Vendor Specific | Vendor Specific information | Defined by vendor |
| 176-177 | 2 | Rx Power High Alarm | RX power high alarm | See Table Of Threshold Ranges |
| 178-179 | 2 | Rx Power Low Alarm | RX power low alarm | See Table Of Threshold Ranges |

| | | | | |
|---------|---|-----------------------|-----------------------------|-------------------------------|
| 180-181 | 2 | Rx Power High Warning | RX power high warning | See Table Of Threshold Ranges |
| 182-183 | 2 | Rx Power Low Warning | RX power low warning | See Table Of Threshold Ranges |
| 184-185 | 2 | Tx Bias High Alarm | Bias current high alarm | See Table Of Threshold Ranges |
| 186-187 | 2 | Tx Bias Low Alarm | Bias current low alarm | See Table Of Threshold Ranges |
| 188-189 | 2 | Tx Bias High Warning | Bias current high warning | See Table Of Threshold Ranges |
| 190-191 | 2 | Tx Bias Low Warning | Bias current low warning | See Table Of Threshold Ranges |
| 192-193 | 2 | Tx Power High Alarm | TX power high alarm | See Table Of Threshold Ranges |
| 194-195 | 2 | Tx Power Low Alarm | TX power low alarm | See Table Of Threshold Ranges |
| 196-197 | 2 | Tx Power High Warning | TX power high warning | See Table Of Threshold Ranges |
| 198-199 | 2 | Tx Power Low Warning | TX power low warning | See Table Of Threshold Ranges |
| 200-207 | 8 | Reserved | Reserved | 00 00 00 00 00 00 00 00 |
| 208-215 | 8 | Reserved | Reserved | 00 00 00 00 00 00 00 00 |
| 216-223 | 8 | Vendor Specific | Vendor Specific information | Defined by vendor |

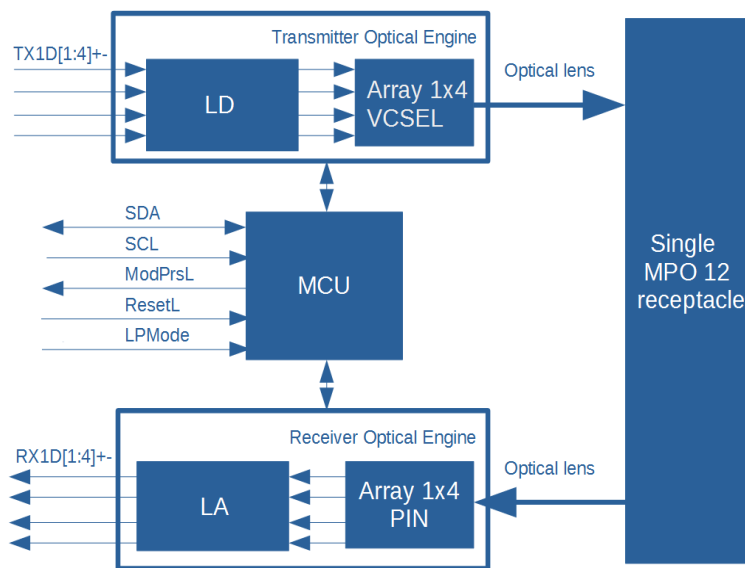
| | | | | |
|-----|---|--|--|----------|
| 224 | 1 | Tx EQ , Rx Emphasis Magnitude ID | Bit7-Bit4=1010 Max Tx input equalization supported Bit3-Bit0=0111 Max Rx output emphasis supported | A7 |
| 225 | 1 | Rx output amplitude support indicators | Bit7-Bit6=00 Reserved Bit5-Bit4=00 Peak-to-peak amplitude stays constant Bit3-Bit0=1111 Rx output amplitude supported | 0F |
| 226 | 1 | Control options advertising | Reserved | 00 |
| 227 | 1 | Control options advertising | Bit7-Bit6=00 This product does not support this function Bit5-Bit4=00 Reserved Bit3=1 Tx Force Squelch implemented Bit2=0 RxLOSL fast mode is not supported Bit1=1 Complies with timing requirements of SFF-8679 optional TxDis fast mode Bit0=0 Reserved | 0A |
| 228 | 1 | Control options advertising | This product does not support this function, Initize to 00 (hex) | 00 |
| 229 | 1 | Control options advertising | This product does not support this function, Initize to 00 (hex) | 00 |
| 230 | 1 | Optional Channel Controls | This product does not support this function, Initize to 00 (hex) | 00 |
| 231 | 1 | Optional Channel Controls | Bit7-Bit4=0000 Reserved Bit3 Tx4 Force Squelch Bit2 Tx3 Force Squelch Bit1 Tx2 Force Squelch Bit0 Tx1 Force Squelch | Variable |
| 232 | 1 | Optional Channel Controls | Reserved | 00 |
| 233 | 1 | Optional Channel Controls | This product does not support this function, Initize to 00 (hex) | 00 |
| 234 | 1 | Optional Channel Controls | Bit7-Bit4 Tx1 input equalizer control Bit3-Bit0 Tx2 input equalizer control | Variable |
| 235 | 1 | Optional Channel Controls | Bit7-Bit4 Tx3 input equalizer control Bit3-Bit0 Tx4 input equalizer control | Variable |
| 236 | 1 | Optional Channel Controls | Bit7-Bit4 Rx1 output emphasis control Bit3-Bit0 Rx2 output emphasis control | Variable |
| 237 | 1 | Optional Channel Controls | Bit7-Bit4 Rx3 output emphasis control Bit3-Bit0 Rx4 output emphasis control | Variable |
| 238 | 1 | Optional Channel Controls | Bit7-Bit4: Rx1 output amplitude Bit3-Bit0: Rx2 output amplitude | Variable |
| 239 | 1 | Optional Channel Controls | Bit7-Bit4: Rx3 output amplitude Bit3-Bit0: Rx4 output amplitude | Variable |

| | | | | |
|---------|---|---------------------------|--|-------------|
| 240 | 1 | Optional Channel Controls | Bit7-Bit4=0000: Rx4-Rx1 squelch enable Bit3-Bit0=0000: Tx4-Tx1 squelch enable | 00 |
| 241 | 1 | Optional Channel Controls | Bit7-Bit4=0000: Rx4-Rx1 output enable Bit3-Bit0=0000: This product does not support this function | 00 |
| 242-243 | 2 | Channel Monitor Masks | Masking Bit for Rx power Alarm/Warning | Variable |
| 244-245 | 2 | Channel Monitor Masks | Masking Bit for Bias current Alarm/Warning | Variable |
| 246-247 | 2 | Channel Monitor Masks | Masking Bit for Tx power Alarm/Warning | Variable |
| 248-249 | 2 | Channel Monitor Masks | Reserved | 00 00 |
| 250-251 | 2 | Channel Monitor Masks | Reserved | 00 00 |
| 252-255 | 4 | Reserved | Reserved | 00 00 00 00 |

Notes:

1. The alarm threshold information can be modified according to the customer's definition, please contact us if you have any modification requirements.

Block-Diagram-of-Transceiver



Functions Description

QSFP-40G-SR4-C-G11 module is manufactured using advanced COB (Chip on Board) process and consists of a microcontroller, a transmitter-side optical engine and a receiver-side optical engine.

The microcontroller communicates with the host computer via a 2-wire serial communication interface and provides module control, status reporting, and monitoring (DOM) functions in accordance with the SFF-8636 standard.

The transmitter-side optical engine consists of a 4-channel laser driver circuit (LD) and a 4-channel VCSEL laser array. The high-speed differential electrical signals output from the host computer are amplified by the laser driver, which drives the VCSEL lasers to generate optical signals, which are coupled into the optical fiber through an optical lens.

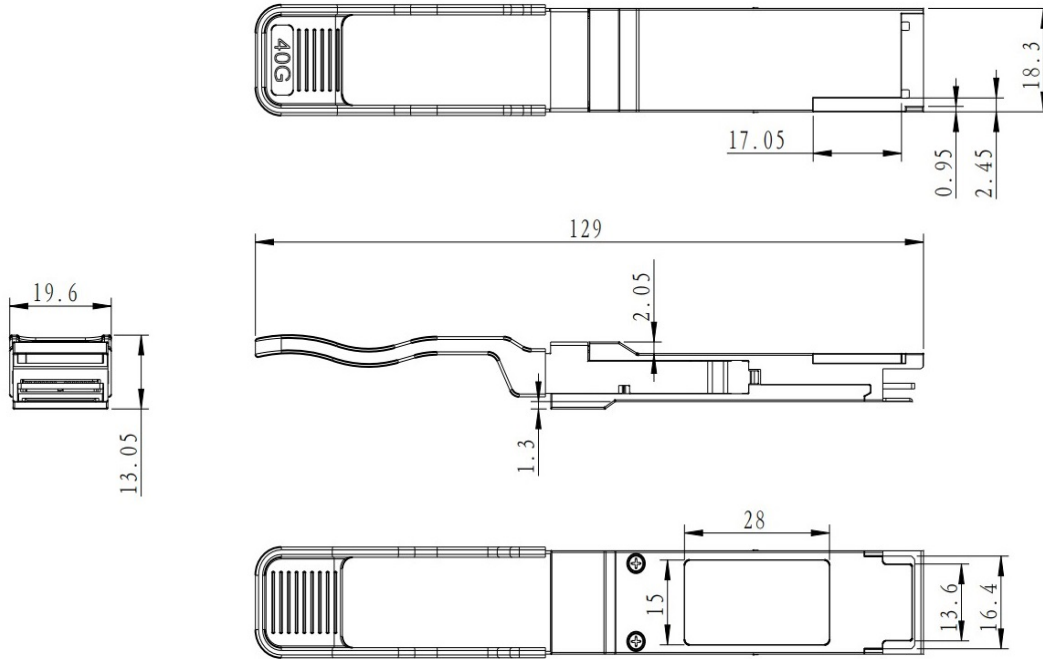
The optical engine at the receiving end includes a 4-channel photodiode (PIN), a 4-channel signal amplifier (TIA/LA). The optical signal in the optical fiber is coupled to the receiving photodiode (PIN) through an optical lens to be converted into a light-generated current, which is augmented by the amplifier and output to the host computer as a high-speed differential signal. The microcontroller reads the signal strength (modulation amplitude) received by the photodiode and reports a loss of the received signal if it is below a set threshold.

Both the transmitter and receiver have the squelch function. When the transmitter has a signal input, the waveform displayed by the oscilloscope of the transmitter light access is an eye diagram shape, and the waveform displayed by the oscilloscope of the transmitter light access when there is no signal input is a straight line, and the actual measured optical power is lower than the normal value of optical power, but not zero; When the incident light at the receiving end has a signal input, access to the oscilloscope shows that the waveform of the output electrical signal is an eye diagram shape, and when there is no signal input, access to the oscilloscope shows that the waveform of the output electrical signal is a straight line.

Dimensions

Module Weight: 40.35g

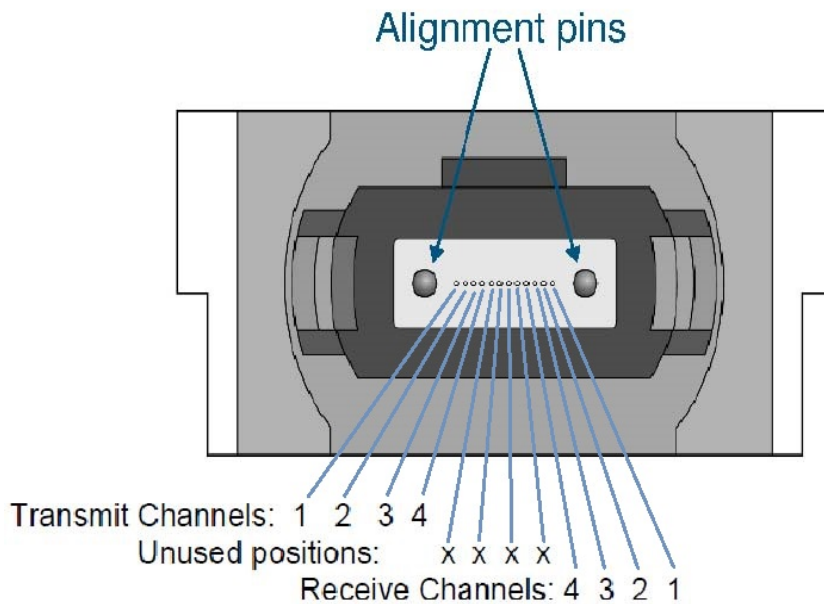
Dust Cap Weight: 0.92g



ALL DIMENSIONS ARE $\pm 0.2\text{mm}$ UNLESS OTHERWISE SPECIFIED
UNIT: mm

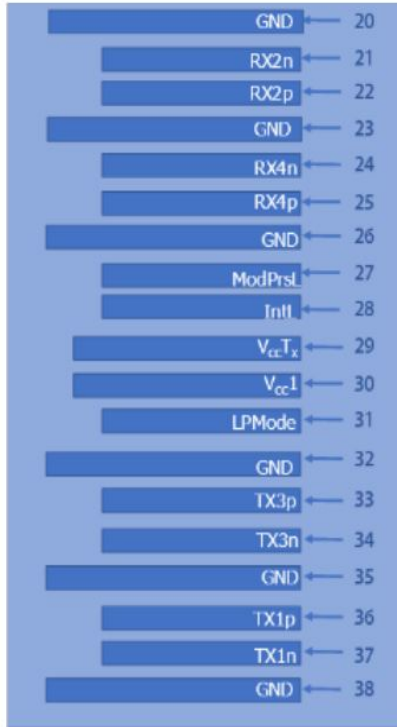
Optical Socket and Channel Orientation for MPO Connectors

Front View Of MPO Optical Port

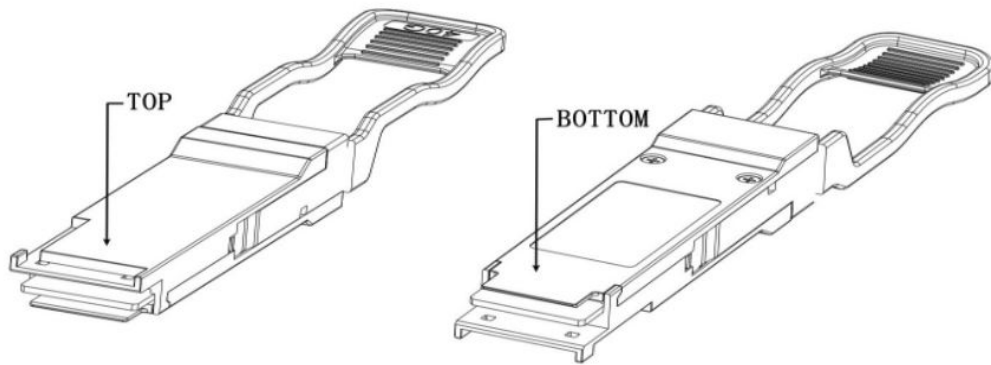


Electrical Pad Layout

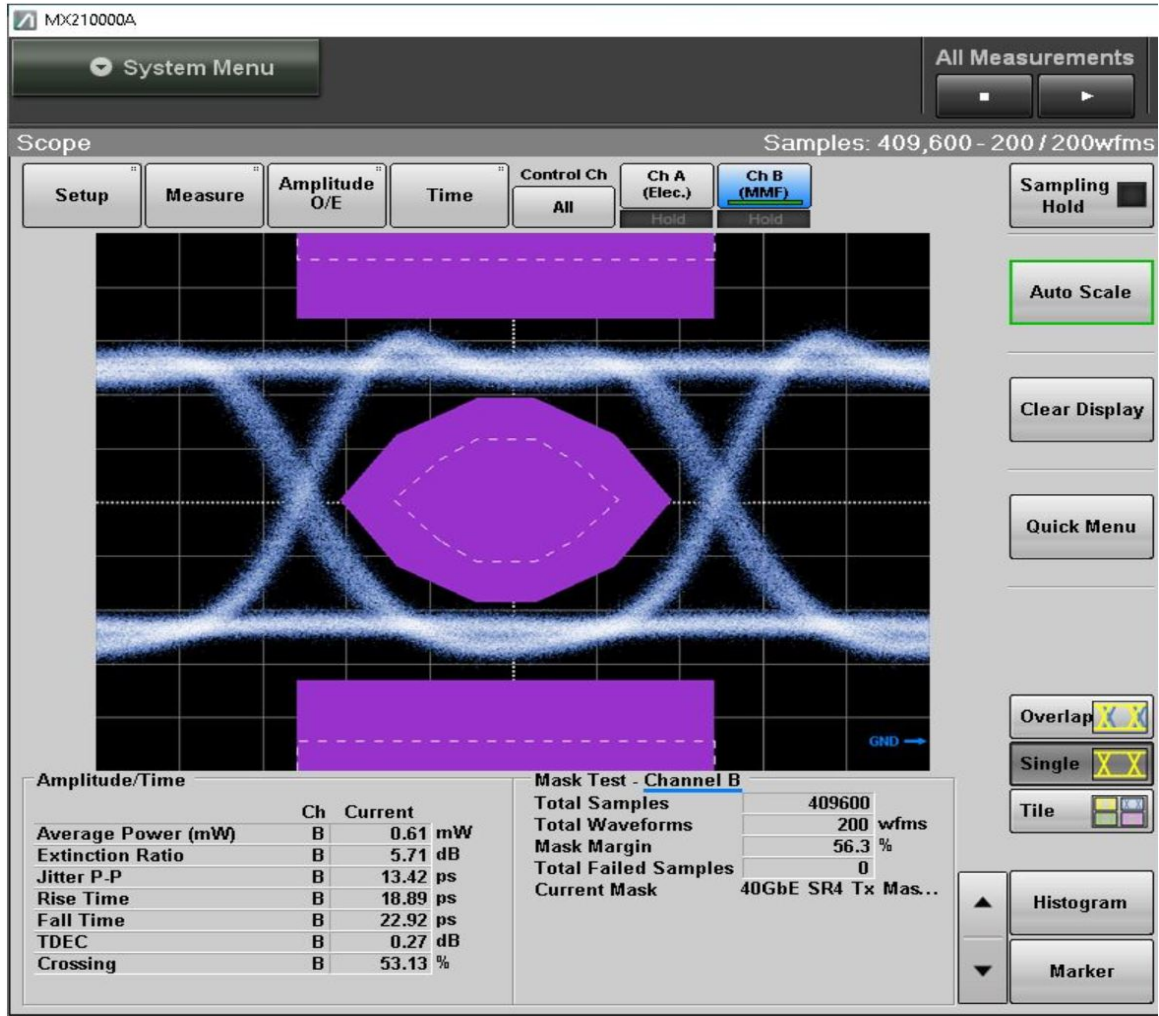
Top View Of Board



Bottom View Of Board



Typical Eye Diagram



Pin Assignment

| PIN # | Symbol | Description | Remarks |
|-------|--------------------------------|--|---------|
| 1 | GND | Ground | 5 |
| 2 | Tx2n | Transmitter Inverted Data Input, LAN2 | |
| 3 | Tx2p | Transmitter Non-Inverted Data Input, LAN2 | |
| 4 | GND | Ground | 5 |
| 5 | Tx4n | Transmitter Inverted Data Input, LAN4 | |
| 6 | Tx4p | Transmitter Non-Inverted Data Input, LAN4 | |
| 7 | GND | Ground | 5 |
| 8 | ModSelL | Module select pin, the module responds to two-wire serial communication when low level | 1 |
| 9 | ResetL | Module Reset | 2 |
| 10 | V _{cc} R _X | +3.3V Power Supply Receiver | |
| 11 | SCL | 2-wire serial interface clock | |
| 12 | SDA | 2-wire serial interface data | |
| 13 | GND | Ground | 5 |
| 14 | Rx3p | Receiver Non-Inverted Data Output, LAN3 | |
| 15 | Rx3n | Receiver Inverted Data Output, LAN3 | |
| 16 | GND | Ground | 5 |
| 17 | Rx1p | Receiver Non-Inverted Data Output, LAN1 | |
| 18 | Rx1n | Receiver Inverted Data Output, LAN1 | |
| 19 | GND | Ground | 5 |
| 20 | GND | Ground | 5 |
| 21 | Rx2n | Receiver Inverted Data Output, LAN2 | |
| 22 | Rx2p | Receiver Non-Inverted Data Output, LAN2 | |
| 23 | GND | Ground | 5 |
| 24 | Rx4n | Receiver Inverted Data Output, LAN4 | |
| 25 | Rx4p | Receiver Non-Inverted Data Output, LAN4 | |
| 26 | GND | Ground | 5 |
| 27 | ModPrsL | Module insertion indication pin, grounded inside the module | |
| 28 | IntL | Interrupt | 4 |
| 29 | V _{cc} T _X | +3.3V Power Supply transmitter | |
| 30 | V _{cc} 1 | +3.3V Power Supply | |
| 31 | LPMoDe | Low power mode, pull-up to Vcc inside the module | 3 |
| 32 | GND | Ground | 5 |

| | | | |
|----|------|---|---|
| 33 | Tx3p | Transmitter Non-Inverted Data Input, LAN3 | |
| 34 | Tx3n | Transmitter Inverted Data Input, LAN3 | |
| 35 | GND | Ground | 5 |
| 36 | Tx1p | Transmitter Non-Inverted Data Input, LAN1 | |
| 37 | Tx1n | Transmitter Inverted Data Input, LAN1 | |
| 38 | GND | Ground | 5 |

Notes:

1. ModSelL is the input pin. The module responds to 2-wire serial communication commands when it is held low by the host. ModSelL allows multiple QSFP modules to be used on a single 2-wire interface bus. If ModSelL is High, the module will not respond to any 2-wire interface communication from the host. ModSelL has internal pull-up resistors in the module.
2. The module restart pin, when the low level on the ResetL pin lasts longer than the minimum pulse length, resets the module and restores all user modules to their default state. When performing reset device, the host should ignore all status bits. Until the module reset interrupt is completed, please note that during hot plugging, the module will issue this information to complete the reset interrupt without resetting.
3. This pin is active high, indicates that the module is operating in low-power mode, this signal has no effect on the function of the product.
4. IntL is the output pin, which is the open collector output and must be pulled up to Vcc on the motherboard. When it is low, it indicates that the module may malfunction. The host uses a 2-wire serial interface to read internal status.
5. Circuit ground is internally isolated from chassis ground.

References

1. IEEE Std 802.3™ 2022.
2. SFF-8636 Specification for Management Interface for 4-lane Modules and Cables Rev 2.11 January 03, 2023.